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09/837,503	04/18/2001	Vincent M. Callaghan	01-104	8044

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EXAMINER

RIDLEY, BASIA ANNA

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 05/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/837,503

Applicant(s)

CALLAGHAN ET AL.

Examiner

Basia Ridley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 April 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities:
  - P4/L22-23, recitation “gas discharged via 18 from the reformer via 16” is not clear and should be replaced with --gas discharged from the reformer via 18--;
  - inconsistent numbering of elements, e.g. reformed gas stream from the fuel processor 12 is referred to as “line 16” (P5/L7) and “conduit 18” (throughout the specification);
  - recitation of “pph” throughout the specification is not clear.

Appropriate correction is required.

### ***Drawings***

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters “6” and “18”, in Fig. 1, have both been used to designate the same stream. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: “16” as recited on P4/L23 and P5/L7. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: “6” in Fig. 1. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference

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sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

5. The drawing(s) is/are objected to as failing to comply with 37 CFR 1.84(q) because reference character(s) 34 in Fig. 1 is/are lacking lead line(s) between itself/themselves and the detail(s) to which it/they refers(s). Applicant is reminded that reference characters which do not need lead lines because they indicate surface or cross-section on which they are placed must be underlined to make it clear that a lead line has not been left out by mistake. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claim(s) 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim(s) 1 is incomplete for omitting essential structural cooperative relationship(s) of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationship(s) is the relationship(s) between “water source” and “water feed means”.

Claim 5 recites “recycling at least a portion of the collected water as the water source”. Said claim is indefinite because is not clear if “water source” is a structural element, as recited in

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claim 1 or a recycled process stream, as recited in claim 5.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claim(s) 1-2, 5 and 11 is/are rejected under 35 U.S.C. 102(b) as being anticipated by Chludzinski et al. (USP 4,473,622).

Regarding claim(s) 1, Chludzinski et al. disclose(s) similar fuel cell system comprising:

- a fuel processor (17) for converting a hydrocarbon fuel (10) into a high temperature reformed gas containing hydrogen, carbon dioxide and carbon monoxide;
- first conduit means for communicating the reformed gas to a shift converter (24) located downstream of the fuel processor (17) for further converting the reformed gas to primarily hydrogen and carbon dioxide containing gas stream;
- second conduit means for communicating the gas stream to a fuel cell (2) downstream of the shift converter (24) for reacting the hydrogen in the gas stream;
- a water source (2); and
- water means (20, 21, 25) for feeding water to at least one of the first and second conduit means in a controlled manner for cooling at least one of the reformed gas and gas stream, respectively to a desired temperature (C3/L42-49).

Regarding claim 2, while Chludzinski et al. does not explicitly disclose that water added to said reformat gas sets the desired oxygen/carbon ratio for the shift converter, said ratio will be set, inherently in the system disclosed by the reference.

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Regarding claim(s) 5 and 11, Chludzinski et al. disclose(s) similar fuel cell system comprising:

- means (20) for collecting water from the fuel cell (2) and recycling at least a portion of the collected water to the at least one of the reformed gas and gas stream;
- wherein water is fed to both the first and the second conduit (by means 20, 21, 25).

Regarding limitations recited in claims 1-2, 5 and 11 which are directed to a manner of operating disclosed system, the examiner notes that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP 2114 and 2115.

Instant claim(s) 1-2, 5 and 11 structurally read(s) on the system of Chludzinski et al.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim(s) 3-4 and 7-8 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Chludzinski et al. (USP 4,473,622) in view of Boochever et al. (USP 4,042,016) or Ginter (USP 3,651,641).

Regarding claim(s) 3-4 and 7-8, Chludzinski et al. disclose(s) all of the claim limitations as set forth above. Additionally the reference discloses that while water transfer devices of the instant invention use polymeric membranes, it is also known in the art to condense water out of the fuel cell effluent and to add said water into another process stream (C7/L9-32), but the

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reference does not explicitly disclose said system including control means for controlling the feeding of water to at least one of the first and second conduit means, wherein the control means senses the temperature of the reformed gas and gas stream, respectively, and feeds water to at least one of the first and second conduits, respectively, in response to the sensed temperature, wherein the system further includes at least one solenoid valve and means to atomize water.

While Chludzinski et al. does not explicitly disclose that the temperature of the gas streams in the first and second conduits needs to be controlled, examiner takes official notice that it was known in the art at the time of the invention to control temperature of gas feed stream for shift reactor and for fuel cell for the purpose of optimizing performance of said shift reactor and for fuel cell.

Additionally it was known in the art at the time of the invention that water can be atomized and sprayed into a gas stream to humidify said gas stream and to provide evaporative cooling of said gas stream. Further it was known in the art at the time of the invention that temperature of said gas stream can be controlled efficiently when flow of water into said gas stream is controlled by a controller comprising a temperature sensor and a solenoid valve (as evidenced by Boochever et al. (columns 2-4) or Ginter (C10/L26-C12/L14)).

In view of the knowledge available to one of the ordinary skill in the art at the time of the invention, as set forth above, an ordinary artisan would replace the water means of Chludzinski et al. with the system including control means for controlling the feeding of water to at least one of the first and second conduit means, wherein the control means senses the temperature of the reformed gas and gas stream, respectively, and feeds water to at least one of the first and second conduits, respectively, in response to the sensed temperature, wherein the system further includes at least one solenoid valve and means to atomize water, as taught by Boochever et al. or Ginter,

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for the purpose of being able to efficiently control the temperature of the gas streams in said first and second conduits, and for optimizing the operation of the shift reactor and the fuel cell.

Regarding limitations recited in claims 3-4 and 7-8 which are directed to a manner of operating disclosed system, the examiner notes that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP 2114 and 2115.

12. Claim(s) 9-10 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Chludzinski et al. (USP 4,473,622) in view of Sederquist (USP 4,530,886).

Regarding claim(s) 9-10, Chludzinski et al. disclose(s) all of the claim limitations as set forth above. Additionally the reference discloses that while water transfer devices of the instant invention use polymeric membranes, it is also known in the art to condense water out of the fuel cell effluent and to add said water into another process stream (C7/L9-32), but the reference does not explicitly disclose said system including a packing of high surface area material and water being fed into the material, wherein said high surface area material is selected from the group consisting of ceramic pellets, steel wool, reticulated ceramic foam, metal foam and honeycomb monoliths.

Sederquist teaches that efficiency of humidification of a gas stream can be increased by using a packing of high surface area material and water being fed into the material, wherein said high surface area material is selected from the group consisting of ceramic pellets, steel wool, reticulated ceramic foam, metal foam and honeycomb monoliths (C3/L47-58).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a packing of high surface area material of Sederquist in the humidifier of Chludzinski et al. for the purpose of increasing humidification efficiency.



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Regarding limitations recited in claims 9-10 which are directed to a manner of operating disclosed system, the examiner notes that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP 2114 and 2115.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

***Allowable Subject Matter***

14. Claim 6 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

15. The following is a statement of reasons for the indication of allowable subject matter: The claim combination wherein the system comprises at least one selective oxidizer between the shift converter and the fuel cell and located downstream of where the water feed means feeds water to the second conduit is allowable over the prior art of record.

***Conclusion***

16. In view of the foregoing, none of the claims are allowed.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (703) 305-5418. The examiner can normally be reached on Monday through Thursday, from 8:30 AM to 7:00 PM.

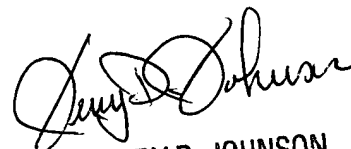
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola, can be reached on (703) 308-6824.

The fax phone number for Group 1700 is (703) 872-9311 (for Official papers after Final), (703) 872-9310 (for other Official papers) and (703) 305-6078 (for Unofficial papers). When filing a fax in Group 1700, please indicate in the Header (upper right) "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communication with the PTO that are not for entry into the file of the application. This will expedite processing of your papers.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Basia Ridley  
Examiner  
Art Unit 1764



JERRY D. JOHNSON  
PRIMARY EXAMINER  
GROUP 1100

BR  
May 15, 2003